Draft

Operable Unit 1 Pre-design Investigation Contractor Quality Control Plan

for the

Diamond Head Superfund Site Kearny, New Jersey

Prepared for:
U.S. Army Corps of Engineers
Kansas City District
700 Federal Building, Kansas City, MO

Prepared by:

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119 Cherry Hill Road
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Draft Contractor Quality Control Plan
for Operable Unit 1 Pre-design Investigation

Diamond Head Oil Superfund Site
Kearny, NJ
USACOE Contract No. W912DQ-11-D-3005
Task Order No. TBD

Approved:

Juliana Hess — Date
CH2M HILL Project Manager

Mark Lucas — Date
CH2M HILL CQCM and RTL

Elizabeth Buckrucker
USACE Project Manager and Quality Control Manager — Date

Grisell Diaz-Cotto — Date
USEPA 2 Project Manager

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Attachments

Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
ASTs	Above Ground Storage Tanks
CQCM	Contractor Quality Control Manager
CQCP	Contractor Quality Control Plan
ER	Engineering Regulation
FFS	Focused Feasibility Study
FS	Feasibility Study
H&SP	Health and Safety Plan
IRM	Interim Remedial Measure
LIF	Laser Induced Fluorescence
LNAPL	Light Non Aqueous Phase Liquid
NCRs	Nonconformance Reports
NJDEP	New Jersey Department of Environmental Protection
P.E.	Professional Engineer
P.G.	Professional Geologist
PM	Project Manager
PRG	Preliminary Remediation Goals
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCT	Quality Control Team
QMP	Quality Management Plan
QP	Quality Procedure
RAO	Remedial Action Objectives
RI	Remedial Investigation
RPM	Regional Project Manager
RTL	Review Team Lead
SAP	Sampling and Analysis Plan
SMP	Site Management Plan
SOP	Standard Operating Procedures
TM-1	Technical Memorandum 1
TM-2	Technical Memorandum 2
TRC	Technical Review Committee
UFP	Unified Federal Policy
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1. Introduction

CH2M HILL has been retained by the U.S. Army Corps of Engineers (USACE), Kansas City District to perform the pre-design investigation (PDI) for Operable Unit 1 at the Diamond Head Oil Superfund Site (Site) located in Kearny, Hudson County, NJ. This Contractor Quality Control Plan (CQCP) has been developed to establish the processes for quality performance throughout the PDI including field work, data evaluation, and end products/deliverables. Accordingly, the goals of this CQCP are:

- Identify field activities/end products/deliverables requiring quality control.
- Identify each critical stage of activities/end products/deliverables for which quality must be controlled.
- Define the acceptability criteria for each field activity/end product/deliverable.
- Define the methods and personnel to be used in determining if the acceptability criteria have been satisfied.
- Identify each member of the quality control team and their defined roles.
- Establish corrective action processes in case acceptability criteria are not met.
- Describe the documentation that will be maintained on quality control.

2. Project Description

The U.S. Environmental Protection Agency (USEPA) Region 2 has initiated an early action to address Light Non-Aqueous Phase Liquid (LNAPL) present at the Diamond Head Superfund site (Site) located in Kearny, NJ. The early action, identified as Operable Unit 1 (OU1), is initiated because the LNAPL is considered to represent a principal threat at the Site that can be mitigated while other site characterization activities planned as part of OU2 Remedial Investigations / Feasibility Studies (RI/FS) continue simultaneously.

The Site is a former oil reprocessing facility, which was in operation until early 1979. The facility operator stored oily wastes in multiple aboveground storage tanks (ASTs) and underground pits. These wastes were intermittently discharged to the wetland area in the south section of the current Diamond Head property and to adjacent land, creating an oil lake covering an estimated 5 acres. The oil lake was subsequently back-filled but light non aqueous phase liquid (LNAPL) is present on top of the groundwater table in the south section of the property. Wastes, believed to be construction-related, were also deposited of in a landfill currently covering an estimated 7 acres along the west section of the property. Contaminants identified at the site during previous investigations include volatile organics, semi-volatile organics, pesticides, PCBs, dioxins, and metals. Contamination has been found in soil, groundwater, surface water, and the sediments in the drainage swale bordering the south property boundary.

2.1 Project Objectives

The general objectives of the OU1 PDI are to collect the information needed to determine the materials that should be considered principal threat wastes and to delineate their occurrence at the Site. Specific objectives include:

- Collect data to support the definition of the physical boundaries of the principal threat waste that would constitute the OU1 Remedial Target Area (RTA).
- Provide information on baseline groundwater conditions at the site before remedy implementation.
- Prepare a Technical Memorandum presenting the results of the PDI activities.

The detailed technical approach for meeting these general objectives is described in the Work Plan. The documents describing the specific procedures that will be used to accomplish this work and to present its results are described in Section 4.

2.2 Project Scope of Work

The following tasks will be performed by CH2M HILL during this project:

- Update the following planning documents to reflect the PDI activities:

  - Uniform Federal Policy - Quality Assurance Project Plan (UFP-QAPP; including all associated sampling procedures)
  - Contractor Quality Control Plan (CQCP)
  - Health and Safety Plan (HASP)
  - Site Management Plan (SMP)

- Prepare subcontractor scopes of work and procure subcontractors for the needed services, facilities, and supplies.

- Mobilize field facilities, equipment, and supplies.

- Complete the PDI following the procedures in the developed planning documents.

  - Prepare the Site for the PDI activities (clear vegetation, build temporary roads).

  - Complete an exploratory test pitting program to observe subsurface conditions and investigate sludge materials and unknown materials observed during previous test pitting activities at the Site.

  - Install soil borings and piezometers to collect the information needed to define principal threat materials and establish the limits of the RTA.

  - Survey investigation locations.

  - Collect 3 quarterly events of water levels and LNAPL thickness measurements from all wells and piezometers (permanent and temporary).

  - For each of the 3 monitoring events, collect 1-month of continuous water level data in select monitoring wells without LNAPL using pressure transducers.

  - Investigation-derived waste (IDW) management, characterization, and disposal.

  - Collect one round of groundwater samples from all 27 monitoring wells at the Site.

- Complete data analyses and reporting activities following completion of the field investigation activities, including the preparation of a Technical Memorandum presenting the results of the performed PDI activities.

2.3 Product Milestones

A detailed schedule is included in both the Work Plan and the UFP-QAPP. This detailed schedule will be reviewed weekly, updated as needed, and updates provided to the USACE, USEPA, and project staff to provide all parties with common understanding of the delivery.

3. Organization and Responsibilities

The organization and responsibilities of the Project Delivery Team and Quality Control Team are outlined in the following subsections. This organization has been established in order to provide clear lines of functional and project responsibility. In addition, a defined management control structure is in place for this project. This management control structure involves the USACE PM, the USEPA PM, and the CH2M HILL PM.

3.1 Project Delivery Team

CH2M HILL has assembled a team of qualified engineers and scientists to complete the PDI scope. The core project team is presented in Table 3-1. This core team will be supplemented by additional staff as necessary.

3.2 Quality Control Team

The members and responsibilities of the Quality Control Team (QCT) are described in the following sections. This team will proceed under the direction of the Contractor Quality Control Manager (CQCM)/Review Team Lead (RTL) and follow the quality control procedures outlined in this CQCP. The CQCM/RTL implements the CQCP, coordinating with members of the QCT so that high quality is achieved and maintained throughout the project. Members of the QCT will review product deliverables explicit to their discipline and project role as described in the following subsections. Recommendations and the approval or disapproval of all final products will be made by the appropriate quality control team member to ensure utilization of each member's technical expertise. Table 3-2 summarizes the responsibilities of the QCT.

3.2.1 Contractor Quality Control /Review Team Lead

The CQCM / RTL is responsible for overall implementation and execution of this CQCP by all QCT members. The CQCM/RTL will ensure that all activities undertaken on this project undergo the appropriate quality control measures as described in the CQCP. Mark Lucas will continue to serve as the CQCM/RTL for this project. Mr. Lucas served as the CQCM / RTL during all phases of work until now. He has the technical experience and site specific knowledge to be effective in this role as well as the project management experience working on USACE and USEPA work assignments.

3.2.2 Project Manager

Juliana Hess will serve as the CH2M HILL Project Manager during the OU1 PDI. Ms. Hess will review all draft and final end products prior to delivery to the USACE and USEPA to confirm that all end products meet quality standards and that the project objectives have been achieved and accurately documented.

3.2.3 Quality Assurance, Senior Technical Support, and Independent Review Team

Senior technical support and quality assurance will be provided by Mr. Murray Rosenberg and Mr. Mark Lucas.

Mr. Rosenberg will provide Independent Review of reporting technical deliverables including technical memorandums and reports created following the field activities.

Mr. Lucas will provide Independent Review of reporting technical deliverables and of planning documents.

This team will utilize their specialized knowledge to efficiently focus on technical aspects of the work, including the analytical and field data, and the results and conclusions from the performed work. They will not be involved in the day-to-day development of these products; however, may be consulted during the planning and development of the product when requested by the project team. Technical reviews will be conducted at the critical stages of development, during appropriate project milestones, during data interpretation, and at the end of each product to verify that the product meets the acceptability criteria presented in Section 6.0

3.2.4 Quality Control Inspector of Field Work

The PDI Lead will serve as the Quality Control Inspector for the field work. The Quality Control Inspector is responsible for quality performance of each field activity. He will oversee the field activities so that the requirements of this CQCP, along with the requirements in the UFP-QAPP, and other project planning documents, are being met.

Andy Judd will serve as the PDI Lead. The PDI Lead will also review all documents prepared as part of the PDI task prior to forwarding for review by the remaining members of the QCT.

3.2.5 Project Chemist

The project chemist will provide oversight of preplanning, field implementation of the sampling, and laboratory analysis for the OU1 PDI. The project Chemist, Mike Zamboni, will also prepare the UFP-QAPP and subcontractor laboratory procurement requirements. During and following the PDI field activities, Mr. Zamboni will coordinate with the CLP/DESA/subcontracted laboratories and will oversee the review of the analytical data and validation results.

4. End Products/Project Deliverables

End products, and their respective product objectives, are presented in the sections below.

4.1 Uniform Federal Policy – Quality Assurance Project Plan

A UFP-QAPP will be developed for the OU1 PDI activities and describe the analytical program. The UFP-QAPP will also present the sampling standard operating procedures (SOPs) for sampling. Several UFP-QAPPs have been previously developed for the Site activities. Sections from these UFP-QAPPs which are common (for example, site descriptions) or can be revised (for example, updated list of contacts) will be used to support the development of the OU1 PDI UFP-QAPP. The document will be specific to the OU1 PDI activities and will reflect the quality assurance and quality control (QA/QC) protocols necessary to achieve the OU1 PDI data quality objectives.

The objectives of the UFP-QAPP are to:

- Follow the explicit procedures and examples provided within the Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP) Manual to develop the project QAPP.
- Detail project specific policy, organization, functional activities, and QA/QC protocols necessary to achieve the established data quality objectives.

4.2 Contractor Quality Control Plan

This CQCP provides CH2M HILL's process for delivering quality work end products while maintaining quality performance throughout the project. The CQCP identifies each end product and demonstrates the procedures which will ensure that acceptability criteria have been achieved at each critical stage of product development. This CQCP was developed using the report and checklist formats of the previous CQCPs. Sections from the previous CQCPs that are applicable were revised and incorporated to ensure consistency between the various phases of work.

The objectives of is revised CQCP are as follows:

- Describe the processes for quality control such that quality performance is maintained throughout the project.
- Describe the QC organization and demonstrate how investigation activities are monitored and how compliance with procedures and the quality of end products will be achieved.

4.3 Health and Safety Plan

The existing H&SP will be revised to include the additional OU1 PDI tasks. The revisions are needed in order to include new potential risks and methods of prevention specifically associated with the OU1 PDI tasks. The H&SP will also be updated with the most current exposure concentrations obtained from the recently completed investigation activities.

The objectives of the revised H&SP are to:

- Present the health and safety considerations specific to the PDI activities.
- Establish health and safety procedures and action levels for each of the activities to be performed at the site during the PDI.

4.4 Site Management Plan

The existing SMP will be revised to reflect the PDI activities. The plan will describe management responsibilities, contact information, and onsite management procedures and planned field facilities and locations. Site operations will be managed to the degree possible, consistent with previous phases of work.

The objectives of the revised SMP are to:

- Describe the facilities and onsite operations during the PDI activities.
- Describe management roles and responsibilities, project contact information, and means of communication.
- Detail site specific access and security procedures, facilities and services, contingency procedures, storage of generated wastes, and field activities tracking and communications systems.

4.5 OU1 PDI Investigation Field Activities

The objectives for the OU1 PDI field investigation activities are presented in the Work Plan. The detailed procedures that will be employed by the project team are detailed in the UFP-QAPP, SMP, H&SP, and this CQCP. The project team will follow these procedures and deviations will be approved and documented before they are implemented.

4.6 Technical Memorandum

The objective of the Technical Memorandum is to present the results and conclusions of the completed PDI activities, including the limits of the OU1 RTA.

5. Critical Stages for Control of Quality

Compliance with quality control requirements will be verified at each critical milestone. End products/deliverables can be divided into three categories: pre PDI planning, execution of the PDI field activities, and reporting activities.

Several documents are developed prior to the start of the field activities (UFP-QAPP, this CQCP, the H&SP, and SMP). Field activities will begin following USACE approval of these planning documents. Upon completion of the PDI field activities, a TM will be prepared to document the results of the conducted activities.

5.1 Control of End Product/Deliverable Preparation

Quality control procedures at each critical stage of document development include:

- A draft version of each document will be prepared for review by the QCT.
- Before beginning work on a document, the CQCM/RTL will lead a discussion, as appropriate, between the Project Manager, the Independent Reviewer, the PDI Lead, and the project team to discuss the outline, scope, information, data analysis, and presentation to be included in each end product/deliverable. The objective of this discussion is to obtain input and guidance from the senior staff supporting the project and streamline the deliverable development and review process.
- An outline of the document will be developed based on the above discussion and provided to USACE and the USEPA for review.
- Internal product checks and interdisciplinary checks will be performed throughout document development.
- Following completion of a draft version, document reviews will first be completed by the PDI Lead followed by review by the Project Manager and Independent Review Team. The reviews will be coordinated by the CQCM/RTL.
- The CQCM/RTL will then lead a discussion, as appropriate, between the Project Manager, the PDI Lead, the Independent Review Team, and the project team to discuss and resolve comments.
- Revisions to the draft document will incorporate applicable comments or changes resulting from the review described above. Comments will be accepted or denied by the author based on the accuracy and validity of the comments. Section 6.0 details the acceptance criteria. Additional accepted scientific/engineering principles, historical data, and other considerations will be utilized in the determining the acceptability of comments.
- Once the Independent Review Team has reviewed the draft document and the comments have been addressed, an editor will review the document for format, grammar, and spelling.

- Hardcopies of the draft will be produced and issued to the USACE and the USEPA for review. The number of copies to be provided will be discussed with the USACE and the USEPA before copies are prepared.
- Following USACE and USEPA review, all comments will be addressed and changes will be incorporated into each document.
- Before beginning to revise a document, the project team will identify comments in need of clarification and will contact the USACE and USEPA for these clarifications. Following these discussions, the project team will prepare a redline of the revised document for backcheck of revisions. Upon USACE and USEPA approval of the revisions, the document will be finalized.
- Revisions to the document will follow the relevant parts of the process for preparing the draft document.
- Hardcopies of the final will be produced and issued to the USACE and the USEPA. The number of copies will be discussed with the USACE and the USEPA before copies are prepared.

5.2 Product Checks and Technical Reviews

Product checks regarding calculations, data accuracy, and the validity of information will be performed by the product development team during the document preparation process. The product development team is responsible for coordinating that checks of their respective sections have been completed. Each checker will be selected based on their expertise, experience level, and the task complexity. Checks will include:

- Appropriate level of quality performance
- Data validity
- Accuracy and correctness of calculations
- Completeness of documentation
- Clarity of narrative

Technical reviews will be documented for each end product. The members of the QCT possess the specialized technical, managerial, or specific task experience to review all end products.

The attachment to this plan contains the forms which will be signed to document the quality control process. The completed forms will be maintained in the project files.

5.3 Control of Field Activities

The PDI Lead will also serve in the role of field Quality Control Inspector. The field task lead / FTL will be responsible for the day-to-day oversight of the field personnel so that the PDI activities are conducted in a manner that meets the acceptability and quality performance criteria. Prior to the initiation of the PDI field activities, the PDI Lead will inspect the site to ensure that the required planning activities have been completed and the appropriate materials and equipment for the field activities are in place.

During routine visits to the site, the PDI Lead will review whether the field activities follow prescribed procedures and whether field documentation (QC checklists and other documentation) is complete to document the field activities. Immediate feedback will be provided to the field task lead and field team on compliance with prescribed procedures and the completeness and accuracy of the documentation. If required by the PDI Lead / Quality Control Inspector, field documentation will be returned to the originator for correction or completion.

The PDI Lead or a qualified alternate inspector will perform a formal QC field audit for each field sampling activity. The purpose will be to review and document whether the activity follows the procedures in the applicable planning documents and whether field documentation is complete and accurate. The daily QC checklist (Checklist 5-1) will be used to document the results of the audit. The checklist will be completed at the end of the audit and provided to the field team along with immediate feedback. Copies of the QC checklist will also be provided to the CQCM/RTL and Project Manager.

Daily activity-specific QC checklists will be completed by the field team to document that field activities follow prescribed procedures. These checklists will be converted to pdf format and emailed once per week to the USACE and the USEPA (planned for Monday for the preceding week) and the originals maintained in the project files. The checklists cover the following activities: test pitting, road construction, drilling and soil sampling, piezometer construction, and groundwater sampling. (Checklists 5-2 through 5-6).

The Field Task Lead/FTL will be responsible for daily reviewing the field activities and for completing the daily QC checklist (Checklist 5-1). These checklists will also be converted to pdf format and emailed once per week to the USACE and the USEPA (planned for Monday for the preceding week) and the originals maintained in the project files.

6. Acceptability Criteria

6.1 Field Activities Criteria

Acceptability criteria for the field and analytical activities are presented in all the planning documents. These contain the quality objectives for each activity, the standards that must be achieved, acceptability/performance criteria, applicable documentation, QC activities and frequencies, and persons responsible for development of the required QC documentation. A summary of the field activities criteria is provided below and summarized in Table 6-1.

Field activity
General quality objective will be as defined in the Work Plan (for example, install soil borings to define the RTA).

Standards
The standards that will be followed are specified in all the planning documents (for example, the piezometer construction SOP specifies the piezometer standards).

Acceptability/Performance Criteria
The field activity will be deemed to be acceptable only if performed in accordance with the applicable standards (e.g., the procedures in the SOP). In some cases, all standards may not be attained. For example, soil borings may vary in depth due to the varying depth at which the peat layer occurs at the site. In all such cases, documentation will be maintained in the field log book as to the reasons why the desired performance criteria could not be achieved.

Applicable quality documentation
Complete the forms identified for the activity in the planning documents (for example, the forms in the groundwater sampling SOP). The frequency will be as specified in the planning documents (for example, per the SOP, measurements will be taken at the specified frequencies). The forms will be maintained onsite.

Complete the daily QC checklist and activity-specific checklist and email in pdf format to the USACE and USEPA.

Complete the QC audit checklist for a field audit and email in pdf format to the USACE and USEPA.

Responsible Person
The Field Task Lead/FTL is responsible for assembling the required documentation per the planning documents including the daily QC checklist and the activity-specific checklists. The FTL is responsible for reviewing these checklists, communicating any noted issues to the PDI Lead, and immediately initiating corrective actions if these appear to be needed based on the completed checklists.

The PDI Lead is responsible for performing the QC audits of each field activity. He is responsible for providing immediate feedback to the FTL and field team on the results of the QC audits so that necessary changes can be made on a real-time basis.

Quality Control Activity/Frequency
The PDI Lead will perform an initial review of site set-up followed by formal QC audits during the implementation of each field sampling activity.

The FTL is responsible for the daily completion of the QC checklists.

The forms in the SOPs will be completed by the field team at the frequencies specified in the SOPs (for example, measurements will be taken at the specified frequencies during groundwater sampling).

6.2 Deliverables Criteria

The primary guidance that will be used for the development of the desired end products/deliverables is the Task Order and corresponding Work Plan for the PDI activities. Other product criteria will be obtained from applicable published USEPA guidance documents. It is difficult to define acceptability criteria for deliverables because of the sometimes, subjective nature of the assessments in the technical evaluations presented in documents. As specific criteria are not readily available, it is important for the project team to closely follow, monitor, and document the process for controlling the quality of deliverables described in this CQCP.

6.3 Regulatory Criteria

Documents will be prepared and field activities conducted in accordance with applicable state and federal regulations. A listing of regulations including those that contain standards and criteria that may be used in data interpretation is presented below.

	Code of Federal Regulations
29 CFR 1910 and 1926	Occupational Safety and Health Standards
40 CFR 260	Hazardous Waste Management Systems: General
40 CFR 261	Identification and Listing of Hazardous Wastes
40 CFR 262	Standards Applicable to Generation of Hazardous Waste
40 CFR 263	Standards Applicable to Transporting of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 300.415	National Oil Hazardous Substance Pollution Contingency Plan, Removal Action
33 USC, Section 1251-1376	Clean Water Act
49 CFR, Parts 107, 171-177	Hazardous Materials Transportation Regulations
40 CFR, Part 6, Appendix A	Protections of Wetlands
40 CFR 257.3	Protection of Wetlands and Endangered Species

State of New Jersey

N.J.A.C-7:7A	Freshwater Wetlands Protection Act Rules
N.J.A.C-7:9B	Surface Water Quality Standards
N.J.A.C-7:9C	Groundwater Quality Standards
N.J.A.C-7-18	Regulations Governing the Certification of Laboratories and Environmental Measures
N.J.A.C-7:26	Solid Waste
N.J.A.C-7:26G	Hazardous Waste

7. Methods to Evaluate Compliance with Acceptability Criteria

As described in Section 5.0 of this CQCP, all documentation and memorandums will undergo a thorough multi-level QC review. Each document will undergo three reviews in the following sequence: 1. Review by the PDI Lead; 2. Review by the Project Manager; and 3. Review by the Independent Review Team.

A preparatory inspection followed by formal QC audits of each field activity will be conducted by the PDI Lead.

During the QC audits, the PDI Lead will review the activities for compliance with prescribed procedures and inspect the field documentation forms relevant to the specific task to verify that acceptability criteria have been achieved.

The results of the QC audits will be documented in a checklist.

8. Nonconformances and Corrective Actions

If acceptability criteria are not achieved, the Project Manager will direct the project team or the responsible subcontractor to repair the item and/or redo the work in order to comply with the acceptability criteria. This may include, but is not limited to: re-sampling, re-testing or creating additional delineation points in order to bring the nonconforming condition into compliance. Re-sampling would be required if the samples were collected from the wrong location or sample depth or if the samples were improperly handled, labeled, or packed (for example, high temperature upon receipt at the laboratory or failure to maintain the samples at the temperatures prescribed in the QAPP). Re-analysis of the sample(s) would be required if the acceptance criteria and procedures presented in the QAPP required this action.

8.1 Nonconformance Reporting

Nonconformance reports (NCRs) will be issued by the CQCM/RTL for items or activities not meeting the acceptable criteria presented in Chapter 6.0 of this plan. Deficiency Notices issued by the USACE and USEPA will also result in the preparation of an NCR by the CQCM/RTL. Nonconformance reports are used to document noncompliances (failure to meet the acceptability criteria) encountered during the normal course of conducting work or found during inspections.

In the course of conducting some activities, it may not be possible to attain the specified acceptance criteria due to the encountered site conditions. An example of such a situation is not attaining the desired depth at a soil boring location due to the type of encountered materials. While this represents a deviation from the acceptance criteria, a corrective action is not required. The necessary data is attained at a depth less the acceptance criteria. Nonconformance reports will not be issued for such situations.

In other cases, the nonconformance may be due to the failure by the project team to follow the established procedures. An example of such a situation is improperly completed paperwork. An NCR issued for this situation will require a corrective action (for example, the Task Lead to review the requirements with the field person who made the mistake).

A NCR will, at a minimum, include the following:

- Detailed description of the nonconforming item or activity
- Cause of nonconformance
- Referenced criteria
- Recommended disposition /corrective action
- Disposition and verification corrective action
- Affected organization or subcontractor

8.2 Nonconformance Disposition

Nonconformance reports will be immediately issued to the CH2M HILL Project Manager and provided to the project team for disposition. Dispositions of NCRs will require the responsible team member to identify the cause, corrective action, action to preclude recurrence and the date when all corrective actions will be completed. Corrective actions will be approved by the CQCM/RTL and the CH2M HILL Project Manager prior to implementation. Nonconformance reports will remain on open status until the corrective actions have been implemented and verified as acceptable by the CQCM/RTL and Project Manager.

Nonconformance reports will be submitted to the USACE and USEPA.

8.3 Consequences of Failure to Implement Quality Control

A lapse in the implementation of this CQCP plan could have a detrimental effect on the overall end products. Failure to achieve the proper level of QC could have negative effects at all levels of the project or across the project as a whole. Failures to implement QC actions will be reviewed to determine the cause of the failure, potential impacts to project, appropriate corrective actions, and potential impacts to the budget, schedule and the ability to meet the project acceptability criteria and goals. Deficiencies in QC implementation will be handled as a nonconformance as described above. The CQCM/RTL will immediately notify the CH2M HILL Project Manager of any QC implementation failures. The CH2M HILL Project Manager will inform the USACE and USEPA of any QC failure. CH2M HILL will directly implement immediate corrective actions to prevent recurrence of the QC failure.

A consequence of a failure of QC is the possibility of an unfavorable A/E evaluation from the USACE.

9. Procedural Reviews

Standard Operating Procedures were developed for the previous phases of investigation and revised to incorporate the procedures and requirements (criteria and documentation) for the PDI activities. New procedures were also developed. These procedures and the associated project-specific forms/checklists will be utilized to record information which will be used to assess whether conformance criteria have been achieved. The SOPs and forms can be found in the UFP-QAPP and SMP and are not repeated here.

10. Documentation and Reporting

CH2M HILL will prepare and submit monthly reports to the USACE and USEPA. The reports will briefly summarize the month's activities by task and discuss work progress, anticipated problems and solutions, deliverables, upcoming events, and financial status. The reports will accompany the monthly invoice and discussion of the project schedule. If applicable, monthly reports will identify instances of nonconformance (whether correctable or not).

All documentation related to the QC process and project execution will be maintained in the project record file system. Project files for the Site will be maintained in CH2M HILL's, Parsippany, New Jersey office.

The following planning, status update/progress, and reporting documents will be generated as part of the PDI:

- UFP-QAPP
- H&SP
- SMP
- Monthly Reports
- Technical Memorandum

If, during the course of field activities, it becomes necessary to request approval for a variance from the approved plans, a request for a variance will be made, where possible, prior to encountering the necessity to do so in the field. Written requests for a Field Work Variance will be submitted to the USACE and USEPA prior to implementation and must be approved by the USACE.

11. References:

CH2M HILL, 2012. *Operable Unit 1Pre-design Investigation Health and Safety Plan for the Diamond Head Oil Superfund Site.* Region 2, Kearny, NJ.

CH2M HILL, 2012. *Operable Unit 1 Pre-design Investigation Site Management Plan for the Diamond Head Oil Superfund Site.* Region 2, Kearny, NJ.

CH2M HILL, 2012. *Operable Unit 1Pre-design Investigation Uniform Federal Policy – Quality Assurance Project Plan for the Diamond Head Oil Superfund Site.* Region 2, Kearny, NJ.

Attachments

STATEMENT OF TECHNICAL REVIEW
Diamond Head Oil Superfund Site, Kearny, New Jersey

Document name:

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CH2M HILL has completed the technical quality review of the submittal of the above deliverable for the Diamond Head Oil Superfund Site, Kearny, New Jersey. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures and material used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results including whether the product meets the customer's needs .

Document Lead Preparer	Signature:	Date:
PDI Lead	Signature:	Date:
Project Manager	Signature:	Date:
Independent Reviewer	Signature:	Date:
Independent Reviewer	Signature:	Date:

STATEMENT OF TECHNICAL REVIEW COMPLETION
Diamond Head Oil Superfund Site, Kearny, New Jersey

Document Name:

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Verification/Acknowledgment

This is to certify that the CH2M HILL Project Team and Quality Control Team have met and reviewed the comments generated during the independent review of this document. All comments resulting from this review have been resolved and incorporated. (Exceptions to be noted on attached pages.)

Document Lead Preparer	Signature:	Date:
PDI Lead	Signature:	Date:
Project Manager	Signature:	Date:
Independent Reviewer	Signature:	Date:
Independent Reviewer	Signature:	Date:

TABLE 3-1

Project Delivery Team Members and Roles
Diamond Head Oil Superfund Site

Member	Project Roles	Office Location	Phone Number
Juliana Hess, P.E.	Project Manager	Parsippany, NJ	(973) 316-9300 ext. 43520
Mark Lucas, P.G.	CQCM, RTL Quality Assurance, Senior Technical Support, QCT	Philadelphia, PA	(215) 640-9045
Murray Rosenberg, P.G.	Quality Assurance, Senior Technical Support, QCT	Philadelphia, PA	(215) 640 9065
Andy Judd	PDI Lead/QC Inspector	Parsippany, NJ	(973) 316-9300 ext. 43523
Mike Zamboni	Project Chemist	Chantilly, VA	(703) 376 5111 ext. 45301
Terri Gerrish	Environmental Compliance	Parsippany, NJ	(973) 316-9300
Carl Woods	Health and Safety Manager	Cincinnati, OH	(513) 889-5771
Austin Harclerode	Field Task Lead/FTL	Parsippany, NJ	(973) 316-0159 ext. 43518
Dave Reamer	Field Team Member	Parsippany, NJ	(973) 316-0159.
Mike Murphy	Field Team Leader	Parsippany, NJ	(973) 316-9300
James Balas	Field Team Member/Field Sample Manager	Parsippany, NJ	(973) 316-9300
Angela Zelman	Administrative	Parsippany, NJ	(973)-316-9300
P.E. = Professional Engineer, P.G. = Professional Geologist			

Table 3-2 Quality Control Team Members and Responsibilities
Diamond Head Oil Superfund Site

Key Personnel	Role	Responsibilities
Juliana Hess	Project Manager	Overall responsibility for implementation of project and quality of deliverable end products Communication with USACE & USEPA regarding all field and reporting activities Reviews all deliverables Manages overall project schedule and budget
Mark Lucas	CQCM, RTL Quality Assurance, Senior Technical Support, QCT	Implementation of the CQCP Implementation of corrective actions identified as a result of conducted checks Performs and documents technical reviews of all overall project management deliverables (SMP, CQCP, QAPP) Performs and documents reviews of project planning documents and technical deliverables Technical guidance and consultation at critical stages of product development Recommending corrective actions to the project team regarding delivery and QC
Murray Rosenberg	Quality Assurance, Senior Technical Support, QCT	Performs and documents reviews of technical deliverables Technical guidance and consultation at critical stages of product development Recommending corrective actions to the project team regarding delivery and QC
Andy Judd	PDI Lead / QC Inspector	Responsible for direction and delivery of field activities, including subcontract management Task schedule and budget management Performs field reviews, documents results, and leads implementation of recommended corrective actions Performs reviews of all deliverables before forwarded to other reviewers Directs FTL
Austin Harclerode	Field Task Lead/FTL	Responsible for day to day management of field activities such that these are performed in accordance with technical requirements in planning documents Subcontract quantity tracking and documentation (weekly statusing of subcontract quantities and costs) Review and recommends approval of subcontract invoices Field work budget statusing Technical writing
Michael Zamboni	Project Chemist	Conducting audit of subcontractor laboratories, if required Prepares/reviews of UFP-QAPP, laboratory SOWs and delivery Review of analytical data and validation results Releases validated data to project team

Table 6-1 Objective, Standards, and Acceptance Criteria for Diamond Head Oil Superfund Site OU1 PDI Activities

Field Activity	Quality Objectives	Standards	Acceptability/Performance Criteria	Applicable Quality Documentation	Responsible Person	Quality Control Activity/Frequency
Mobilization	To ensure that all facilities, services, and equipment are properly in place and functioning.	OU1 PDI H&SP OU1 PDI SMP	Project planning performed in accordance with specified standards including: USACE and USEPA approval to proceed Project documents approved Subcontracts have been procured Functioning equipment, facilities, and services	QC Daily inspection checklist (5-1) Documentation of activities in log book	Implementation: FTL QC Review: PDI Lead	Site inspection by PDI Lead prior to initiation of activities.
Health and Safety Implementation	To ensure that all site personnel, subcontractors, visitors and public are protected from physical harm and exposure. Ensure that all Contractor, Subcontractor, and visiting personnel read the Site H&SP and sign the appropriate signature page. Ensure that all H&S equipment is in place and inspected as required by H&SP.	OU1 PDI H&SP OU1 PDI SMP	H&S equipment and supplies available onsite per H&SP All work performed in accordance with the site H&SP	QC Daily inspection checklist (5-1) Self-assessment checklist Equipment calibration logs Documentation of activities in log book	Implementation: FTL Field team QC Review: PDI Lead	Site inspection by PDI Lead prior to initiation of activities.
Survey of soil boring/piezometer locations and elevations	To stake out the planned soil boring/piezometer grid and, after the completion of the drilling activities, to accurately survey and document their locations and elevations.	OU1 PDI Work Plan Surveying Statement of Work	All work performed in accordance with surveying statement of work.	QC Daily inspection checklist (5-1)	Implementation: FTL QC Review: PDI Lead	QC audit of each activity by PDI Lead. QC audit reviews whether activities follow prescribed procedures and accuracy and completeness of field documentation. Daily QC review by FTL.
Test Pitting	To observe subsurface conditions and obtain samples from sludge and unknown materials.	OU1 PDI SMP OU1 PDI Work PlanOU1 PDI QAPP SOP Test Pitting Other related sampling SOPs (Sample Nomenclature, Chain of Custody Procedures, GPS, Field Parameter Forms, Sample Collection, Sample Packaging)	Test pits excavated and collection of samples completed to specified standards including: Proper documentation of field observations Proper calibration procedures Proper decontamination of equipment Careful selection of sampled materials and documentation of basis for selection Proper collection, identification, and handling of samples Sample quantities/volume met Followed standard procedure	QC Daily inspection checklist (5-1) QC Audit checklist specific to activity (5-2) Field logs specific to each applicable SOP	Implementation: FTL Field team QC Review: PDI Lead	QC audit of each activity by PDI Lead. QC audit reviews whether activities follow prescribed procedures and accuracy and completeness of field documentation. Daily QC review by FTL.
Vegetation Clearance and Temporary Road Construction	Properly clear areas of vegetation and construct roads to support heavy equipment.	OU1 PDI Work Plan OU1 PDI SMP SOP Road Construction	Vegetation clearance and temporary roadways to specified standards including: Vegetation removed in designated areas Roadway dimensions achieved based on field conditions Construction materials in accordance to specifications Complete and accurate documentation of activities Followed standard procedure	QC Daily inspection checklist (5-1) QC Audit checklist specific to activity (5-3) Field logs specific to each applicable SOP	Implementation: FTL Field team QC Review: Task lead	QC audit of each activity by PDI Lead. QC audit reviews whether activities follow prescribed procedures and accuracy and completeness of field documentation. Daily QC review by FTL.
Soil boring installation and soil sampling	Obtain data to help define the remedial target area.	OU1 PDI Work Plan OU1 PDI SMP OU1 PDI QAPP SOP Soil boring installation methods and soil sampling SOP Borehole abandonment SOP Subsurface Soil Sampling Other related sampling SOPs (Sample Nomenclature, Chain of Custody Procedures, Field Parameter Forms, Sample Collection, Sample Packaging)	Installation of soil borings and collection of soil samples completed to specified standards including: Proper calibration procedures Proper decontamination of equipment Careful selection of sampling depths and documentation of basis for selection Proper collection, preservation, identification, and handling of soil samples Sample quantities/volume met Followed standard procedure	QC Daily inspection checklist (5-1) QC Audit checklist specific to activity (5-4) Field logs specific to each applicable SOP	Implementation: FTL Field team QC Review: Task lead	QC audit of each activity by PDI Lead. QC audit reviews whether activities follow prescribed procedures and accuracy and completeness of field documentation. Daily QC review by FTL.
Piezometer installation	Install piezometer to collect data to help define the remedial target area.	OU1 PDI Work Plan OU1 PDI SMP OU1 PDI QAPP SOP Piezometer installation Other related sampling SOPs (Field Parameter Forms)	Installation of piezometers completed to specified standards including: Proper calibration procedures Proper decontamination of equipment Careful construction on piezometer to design standards Followed standard procedure	QC Daily inspection checklist (5-1) QC Audit checklist specific to activity (5-5) Field logs specific to each applicable SOP	Implementation: FTL Field team QC Review: Task lead	QC audit of each activity by PDI Lead. QC audit reviews whether activities follow prescribed procedures and accuracy and completeness of field documentation. Daily QC review by FTL.

Table 6-1 Objective, Standards, and Acceptance Criteria for Diamond Head Oil Superfund Site OU1 PDI Activities

Field Activity	Quality Objectives	Standards	Acceptability/Performance Criteria	Applicable Quality Documentation	Responsible Person	Quality Control Activity/Frequency
Groundwater sampling and water levels and LNAPL thickness measurements	Collect groundwater samples and water level measurements to provide data to support the remedial design and to provide a baseline of groundwater conditions prior to installation of the biocell.	OU1 PDI Work Plan OU1 PDI SMP OU1 PDI QAPP SOP GW Sampling Below LNAPL SOP WL and LNAPL thickness measurements SOP Low-flow groundwater sampling Other related sampling SOPs (Sample Nomenclature, Chain of Custody Procedures, Field Parameter Forms, Sample Collection, Sample Packaging)	Collection of groundwater samples and level measurements conducted to specified standards including: Proper calibration procedures Proper decontamination of sampling equipment Proper collection, preservation, identification, and handling of samples Sample quantities/volume met Followed standard procedure	QC Daily inspection checklist (5-1) QC Audit checklist specific to activity (5-6) Field logs specific to each applicable SOP	Implementation: FTL Field team QC Review: Task lead	QC audit of each activity by PDI Lead. QC audit reviews whether activities follow prescribed procedures and accuracy and completeness of field documentation. Daily QC review by FTL.

QC Checklist 5-1

Diamond Head Oil Superfund Site

Harrison Avenue @ I-280, Kearny, NJ 07032 (Hudson Co.)

Daily Checklist

Today's General Work Activities: _____

The purpose of daily QC checklist is to verify that work is conducted according to procedures in the QAPP, including required documentation.
Refer to the appropriate sections of the QAPP as well as the SOP's and field documentation forms applicable to the performed activity.

Name of person providing the field report:: _____ Date / Time: _____

Name of Task Lead /PM receiving the report: _____

Specific Work Completed: _____

1) Were specified procedures followed? Yes ____ No ____

If no, describe reason. _____

If no, describe appropriate corrective actions to prevent re-currence _____

2) Was specified documentation completed? Yes ____ No ____

If no, describe reason. _____

If no, describe appropriate corrective actions to prevent re-currence _____

3) Were there any deviations from planned scope? Yes ____ No ____

If yes, describe reason. _____

If yes, describe plan (who, when) for notifying USACE and USEPA _____

4) Were there any exceedances of H&SP action levels? Yes ____ No ____

If yes, describe where & possible reason. _____

If yes, describe appropriate corrective actions to prevent re-currence _____

5) Any subcontractor performance / issues _____

6) Site visitors _____

7) Other _____

8) Plans for next day _____

QC Checklist 5-2
Diamond Head Oil Superfund Site
Harrison Avenue @ I-280
Kearny, NJ 07032 (Hudson Co.)
Test Pitting and Sample Collection

The intent of a field QC audit is to ensure that work is conducted according to procedures set forth in the project planning documents, and to review field documentation procedures.
Refer to the appropriate sections of the UFP-QAPP as well as the SOP's and field documentation forms for this activity.

QC Inspector: _____ Date / Time: _____

Review Item	Yes	No	N/A
1) Was the Scope of Work reviewed with the subcontractor?			
2) Were daily health and safety briefings conducted?			
3) Was the monitoirng equipment calibrated daily?			
4) Were photographs taken at each test pit?			
5) Were GPS coordinates of each test pit recorded?			
6) Were Test Pit Logs completed documenting observations, sludge, unknown materials, staining, other?			
7) Were samples collected following SOPs?			

Provide an explanation for any "NO" or "Not Applicable" responses:

_____
_____
_____
_____

Corrective Actions
List all corrective actions. Initial and Date the second column when completed.

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

QC Checklist 5-3
Diamond Head Oil Superfund Site
Harrison Avenue @ I-280
Kearny, NJ 07032 (Hudson Co.)
Road Construction

The intent of a field QC audit is to ensure that work is conducted according to procedures set forth in the QAPP, and to review field documentation procedures.
Refer to the appropriate sections of the QAPP as well as the SOP's and field documentation forms for this activity.

QC Inspector: _____ Date / Time: _____

Review Item	Yes	No	N/A
1) Was the Scope of Work reviewed with the subcontractor?			
2) Were daily health and safety briefings conducted?			
3) Was the "Road Construction Record" completed for each road segment constructed?			
4) Were photographs taken after each stage of construction (grading, getotextile, stone placement)?			
5) Were GPS coordinates of measurement points recorded?			
6) Was the road width recorded at the measurement points?			
7) Was the stone bed thickness measured at the measurement points?			

Provide an explanation for any "NO" or "Not Applicable" responses:

_____
_____
_____
_____

Corrective Actions
List all corrective actions. Initial and Date the second column when completed.

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

QC Checklist 5-4

Diamond Head Oil Superfund Site

Harrison Avenue @ I-280, Kearny, NJ 07032 (Hudson Co.)

Drilling, Soil Boring Installation and Soil Sampling Activities

The purpose of daily QC checklist is to verify that work is conducted according to procedures in the UFP-QAPP, including required documentation.

Refer to the appropriate sections of the UFP-QAPP as well as the SOP's and field documentation forms for technical details related to this activity.

QC Inspector: Date / Time:

1) Were specified QAPP / SOP / WP procedures followed?	Yes	No	N/A

Drilling	**Yes**	**No**	**N/A**
2) Were subsurface & overhead utilities cleared before commencing drilling?			
3) Were daily equipment and safety checks completed for drilling and associated equipment?			
4) Was safety monitoring equipment (e.g., Multi-gas meter, PID) calibrated and employed throughout drilling?			
5) Did CH2M HILL staff review specific objectives and target depths for each boring prior to commencing?			
6) Were all soil borings grouted and abandoned upon completion?			
7) Were monitoring wells constructed and grouted to seal conduits to subsurface?			
8) Were sampling locations marked sufficiently for reproducibility & survey?			

Soil Borings	**Yes**	**No**	**N/A**
9) Were soil cores and/or soil samples collected as per Work Plan?			
10) Were soil boring logs and sample documentation completed and filed?			
11) Was a PID used to scan soil cores and readings recorded on boring logs?			
12) Was gross contamination (e.g. liquid LNAPL) encountered or other unusual observations?			

Soil Sampling	**Yes**	**No**	**N/A**
13) Were sampling objectives for specific boring locations reviewed prior to commencing?			
14) Were soil samples collected and labeled / documented per QAPP & SOP specifications?			
15) Was sufficient sample volume obtained for all samples?			
16) Were samples placed on ice immediately following collection?			
17) Were additional samples collected based on observation of suspected contamination?			

Explain why any "No" or "N/A" Answers apply:

QC Checklist 5-5

Diamond Head Oil Superfund Site

Harrison Avenue @ I-280, Kearny, NJ 07032 (Hudson Co.)

Piezometer Construction

The purpose of daily QC checklist is to verify that work is conducted according to procedures in QAPP, including required documentation.
Refer to the appropriate sections of the QAPP as well as SOP's and field documentation forms for technical details related to this activity.

QC Inspector: Date / Time:

1) Were specified QAPP / SOP / WP procedures followed? **Yes** **No** **N/A**

Piezometer Construction	**Yes**	**No**	**N/A**
1) Did CH2M HILL staff review specific objectives and target depths for each piezometer prior to commencing?			
2) Were piezometer construction materials clean, factory wrapped and/or pressure washed before use?			
3) Was an appropriate bottom cap / plug installed on the well screen?			
4) Was the well screen slot-size varified before construction			
5) Were the piezometer materials constructed without the use of glues / solvents?			
6) Was the well gravel / sand specification varified, certified clean, and in good/dry condition before use?			
7) Was the bentonite material specification varified, certified clean, and in good/dry condition before use?			
8) Was sand bridging checked for / cleared during installation of well gravel / sand?			
9) Was the well annular space grouted the same day to avoid cross-contamination?			
10) Was a water tight compression cap and lock installed on the piezometer?			
11) Was the piezometer marked with the piezometer ID?			
12) Were piezometer construction logs completed thoroughly and filed?			
13) Was liquid LNAPL observed in any piezometer?			

Explain why any "No" or "N/A" Answers apply:

QC Checklist 5-6

Diamond Head Oil Superfund Site

Harrison Avenue @ I-280, Kearny, NJ 07032 (Hudson Co.)

Groundwater Sampling - Water Level Measurements - LNAPL Thickness Measurements

The purpose of daily QC checklist is to verify that work is conducted according to procedures in the QAPP, including required documentation.

Refer to the appropriate sections of the QAPP as well as the SOP's and field documentation forms for technical details related to this activity.

QC Inspector: Date / Time:

1) Were specified QAPP / WP procedures followed? **Yes** **No** **N/A**

Groundwater Sampling	**Yes**	**No**	**N/A**
1) Did CH2M HILL staff review specific sampling requirements prior to commencing?			
2) Was dedicated teflon-lined tubing and a decontaminated pump used at each location?			
3) Was a water quality multi-meter used during sampling and calibrated prior to use?			
4) Were low-flow sampling procedures followed?			
5) Did groundwater quality parameters stabilize prior to sampling?			
6) Was the water level / drawdown monitored during purging?			
7) Was the purge rate 200 - 500 ml/min during sampling?			
8) Was adequate volume obtained for all samples (including extra QC volumes)?			
9) Were VOC samples colleced with no bubbles or head space?			
10) Were samples labeled and placed on ice immediately following sampling?			

Water Level & LNAPL Thickness Measurements	**Yes**	**No**	**N/A**
11) Was the well ID verified prior to collecting measurements?			
12) Was an electronic oil-water interface probe used for measurements?			
13) Were "synoptic" measurements collected within the shortest amount of time possible?			
14) Were water levels collected from wells without LNAPL before measuring known LNAPL locations?			
15) Were the probe tip and tape decontaminated between all measuring locations?			
16) Were LNAPL thickness measurements collected from both "top-down" and "bottom-up" ?			
17) Were measurements recorded at the time they were collected?			
18) Were measurements recorded to the hundredth place (x.xx ft) ?			

Explain why any "No" or "N/A" Answers apply: